

## **IODP Expedition 327: Juan de Fuca Ridge-Flank Hydrogeology**

### **Week 1 Report (5–11 July 2010)**

11 July 2010

#### **OPERATIONS**

Expedition 327 began on 5 July 2010, following the *JOIDES Resolution*'s maintenance in Victoria, British Columbia, Canada. Crew change took place on July 5 and 6 for IODP and Transocean personnel, respectively. Vessel maintenance activities included the certification of the freight elevator and the loading of 1800 metric tons of marine gas oil. Routine activities included the loading of supplies, food, and CORK-related hardware and the offloading of Expedition 318 cores. The last line was released at 1212 hr on 9 July and the vessel was underway for the 196-nmi journey to prospectus Site SR-2. We arrived at Site U1362 at 0815 hr on July 10 and deployed a positioning beacon at 0922 hr. The vessel was positioned 15 meters west of the coordinates of Hole U1362B and the bottom hole assembly and drill string were assembled. Seafloor was tagged at 2672 meters below rig floor (mbrf) at 2200. A jet-in test was initiated at 2230 hr and was completed by 1100 hr on July 11. The drill string was pulled clear of the seafloor and the vessel moved ~300 meters in DP mode to a position 15 meters west of the coordinates of Hole U1362A. The seafloor was again tagged at 2672 mbrf and a second jet-in test was initiated at 1250 hr.

#### **SCIENCE RESULTS**

The first week of the expedition was dominated by port call activities. The scientists and outreach officers boarded the ship on 6 July and on July 7–8 participated in meetings on the expedition's scientific and outreach objectives, scientist work flow and deliverables, ship and lab safety, life on board, computer resources, and lab space usage.

The core description and physical properties teams started training on software and instruments. The engineering staff with the help of scientists visiting from the Pacific Geoscience Center worked on plumbing the CORK instrument bays. The education officers participated in Deep Earth Academy orientations during the port call. The group included the education officers for the South Pacific Gyre and Mid-Atlantic Ridge Microbiology expeditions.

The co-chief scientists and staff scientist met with the curator to identify any pending issues before formulating the sampling plan with the science party. It was agreed to utilize a watchdog when samples are taken for shipboard analyses and to defer all personal sampling of igneous cores until coring is completed at each hole (U1362A and 1027C). The formulation of a sampling plan for the alternate sites will be postponed until we have a better idea of the operational days available at the end of the cruise.

Expedition 327 is a critical part of a long-term multidisciplinary experiment that builds from technical and scientific achievements and lessons learned during ODP Leg 168 and IODP Expedition 301. The main goal of this experiment is to evaluate formation-scale hydrogeologic properties (transmission and storage) within oceanic crust; determine how fluid pathways are distributed within an active hydrothermal system; establish links between fluid circulation, alteration, and geomicrobial processes; and determine relations between seismic and hydrologic anisotropy. During Expedition 327 we will install subseafloor observatories in two new holes in oceanic crust at proposed Site SR-2; deepen and replace an observatory in ODP Hole 1027C to facilitate long-term monitoring; and replace an instrument string deployed with the Hole U1301B CORK during Expedition 301. Following Expedition 327, submersible expeditions will allow us

to conduct single- and crosshole hydrologic experiments using a complete network of six observatory systems that use CORKs as perturbation and monitoring points. This expedition will be dominated by subseafloor observatory installation operations, and hence science activities will consist of ~200 m of basement coring at proposed Site SR-2 and ODP Site 1027, downhole logging, and drill string hydrologic testing.

If time allows, coring will be conducted at alternate sites GRB-1A, GRB-2A, and GRB-3A to define changes in chemical and microbial processes in a crustal fluid recharge zone at Grizzly Bare outcrop.

Expedition 327 includes an international education and outreach program intended to develop tools and techniques that facilitate the communication of exciting scientific drilling results to a broad audience, build educational curricula, and create media products that will help achieve critical outreach goals.

#### **TECHNICAL SUPPORT AND HSE ACTIVITIES**

**HSE activities:** Laboratory and ship safety tours were conducted for the science party and the new engineering/technical staff per TAMU Hazardous Communication policy. In addition, science party and new staff attended the Captain's safety talk. The weekly fire and boat drill was held as scheduled.

#### **Laboratory activities:**

Technical staff completed logistics activities in Victoria BC, and secured the science spaces for departure. Laboratory spaces were reconfigured and temporary counter space constructed to support the various needs of the expedition. Cores previously recovered from Sites 1026, 1027 and U1301 were moved to the core lab for study and re-sampling.

Projects started include remodeling of the internet café, the SHMSL hardware upgrade, the WCMSL software upgrade, the MAD/PYNC software upgrade, installation of the RO water tank in the chemistry lab, and installation of the analytical gas monitoring system.